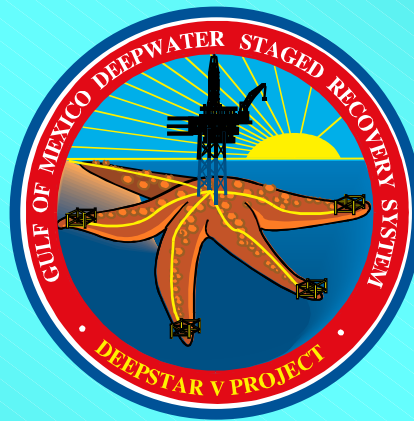




# ***Ultra-Deep Water***

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## ***DeepStar***



# Today's Discussion

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- Who/what is DeepStar
- What production facilities may look like
- Technology approach for ultra-deep water production



# What Is DeepStar ?

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- **Joint Industry Project (collaboration)**
- **Deep Water Technology Focus**
- **100% Funded By Industry**
- **During Phase V**
  - **16 Oil Companies**
  - **48 Service Companies**
- **ChevronTexaco Leadership**
- **\$46,000,000 Spent Over 10 Years**



# DeepStar Phase V Participants

**ChevronTexaco**

**UNOCAL 76**

**Anadarko**  
Petroleum Corporation

**TOTAL FINA ELF**



**CONOCO**



**PETROBRAS**

**ExxonMobil**



**Marathon  
Oil Company**



# DeepStar Phase V Contractor Contributors





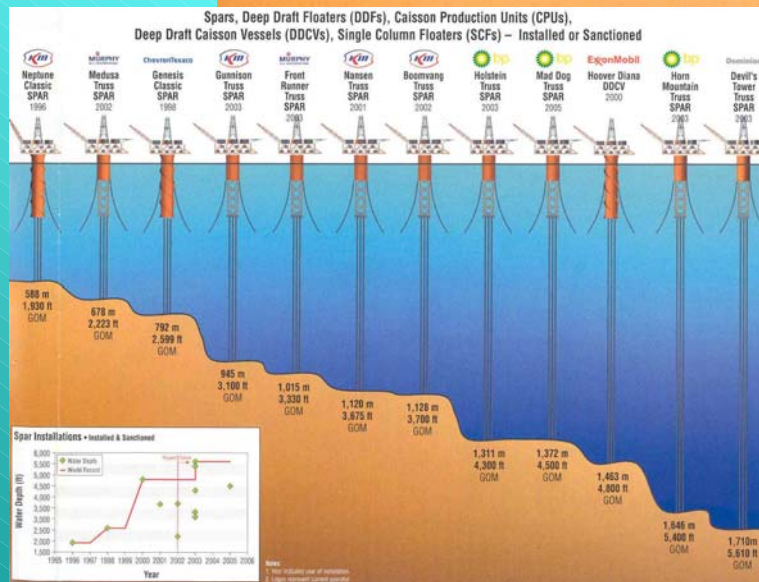
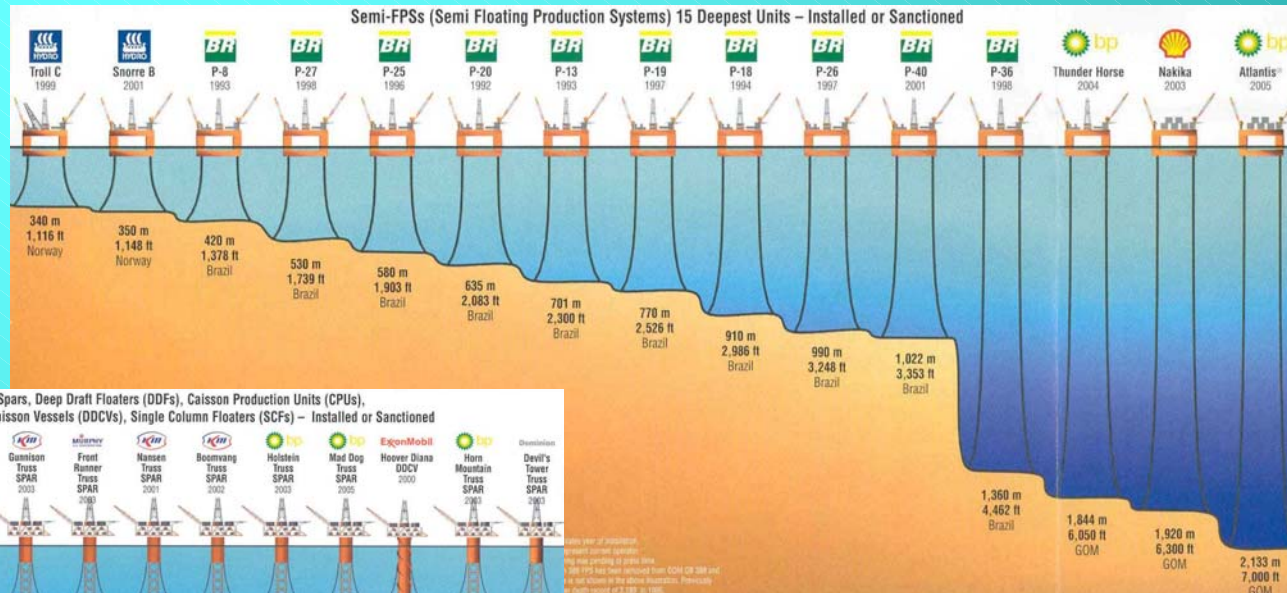
# Ultra-Deep Water

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- Advance into deeper water - incremental steps
- Developments in 7000 feet are happening
- The next step – production in 8,000 to 10,000 ft.
- Continued evolution of current capabilities
- Meet/exceed current performance

(safety, environment, commercial)

# Steps To 7,000 Feet

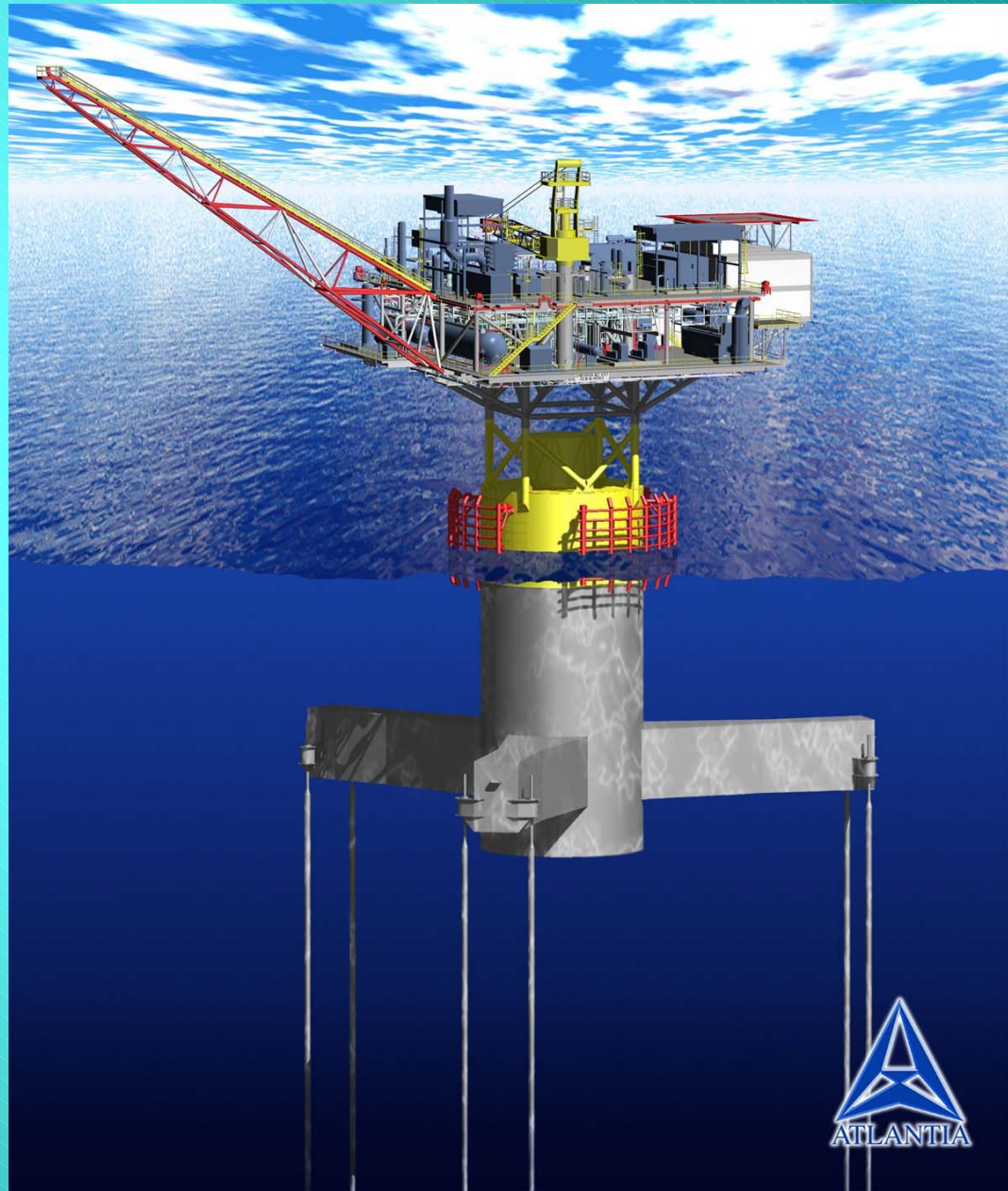


ChevronTexaco

Typhoon

Mini TLP

2,100 Feet  
Water Depth

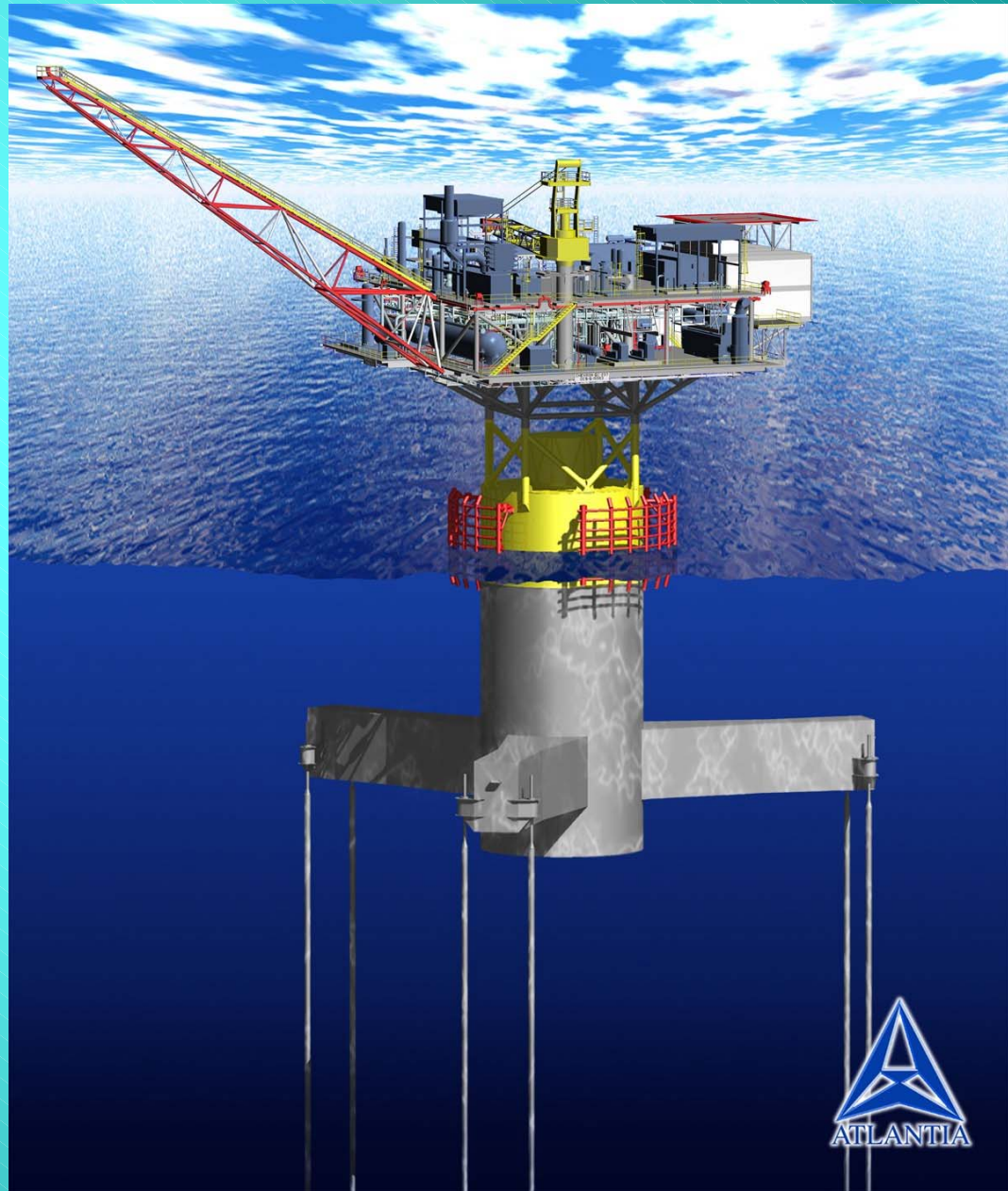


ChevronTexaco

Typhoon

Mini TLP

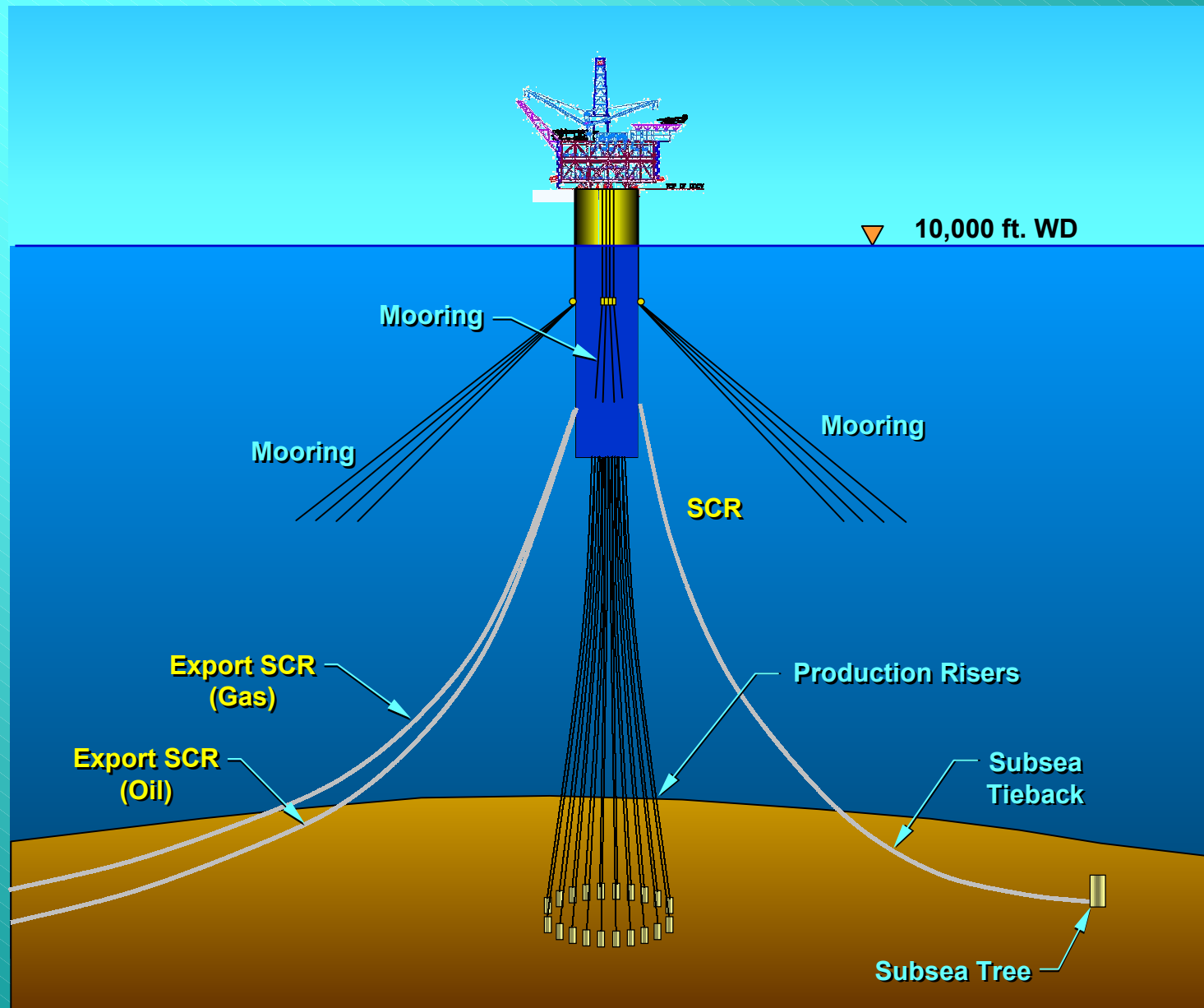
2,100 Feet  
Water Depth





MORPETH - 1,700 Feet Water Depth

# SPAR



ChevronTexaco

Genesis Spar

2,599 Feet  
Water Depth



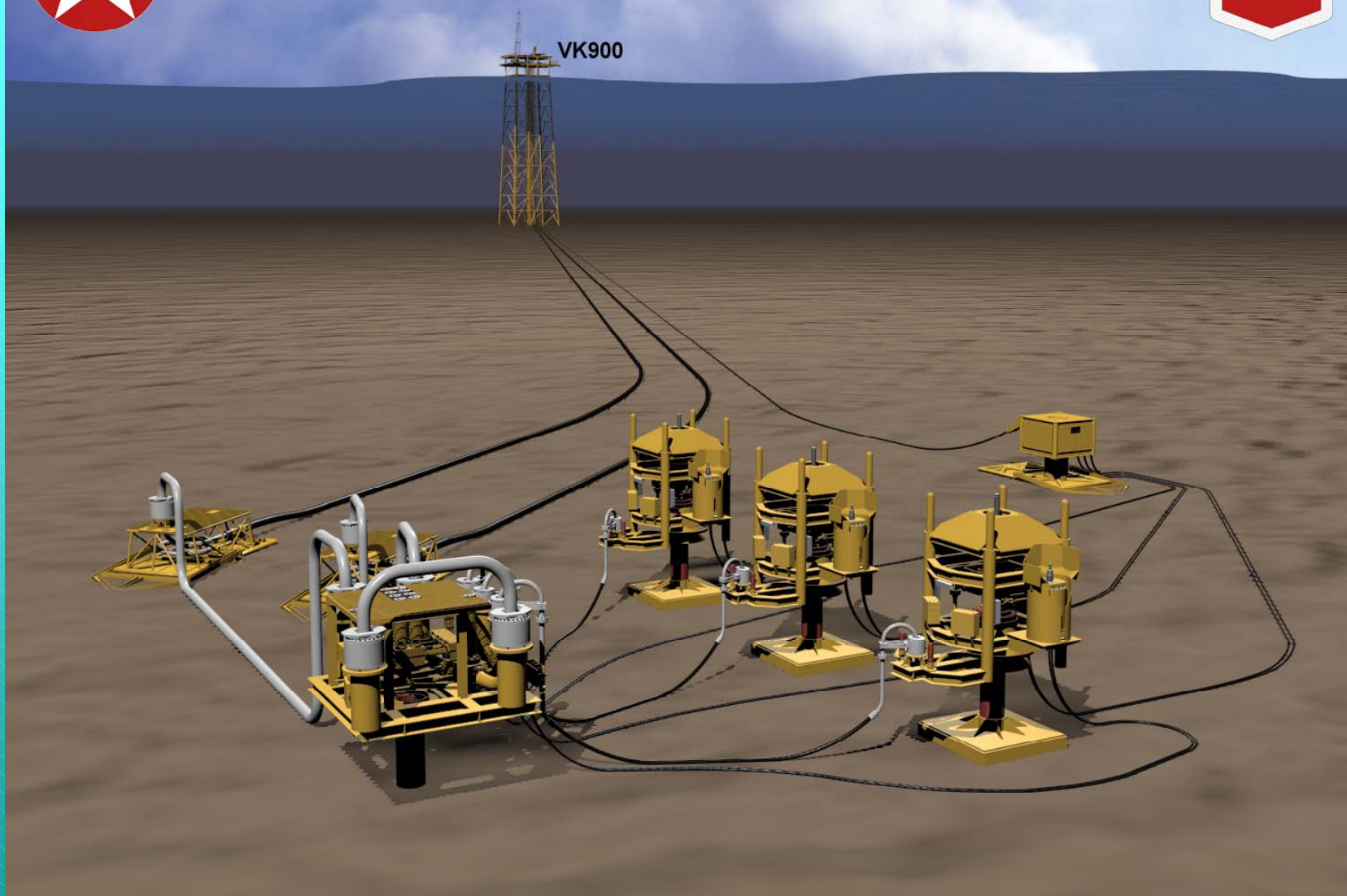


**Albacora Leste – Brazil**  
Approximately 4,000 Feet Water Depth

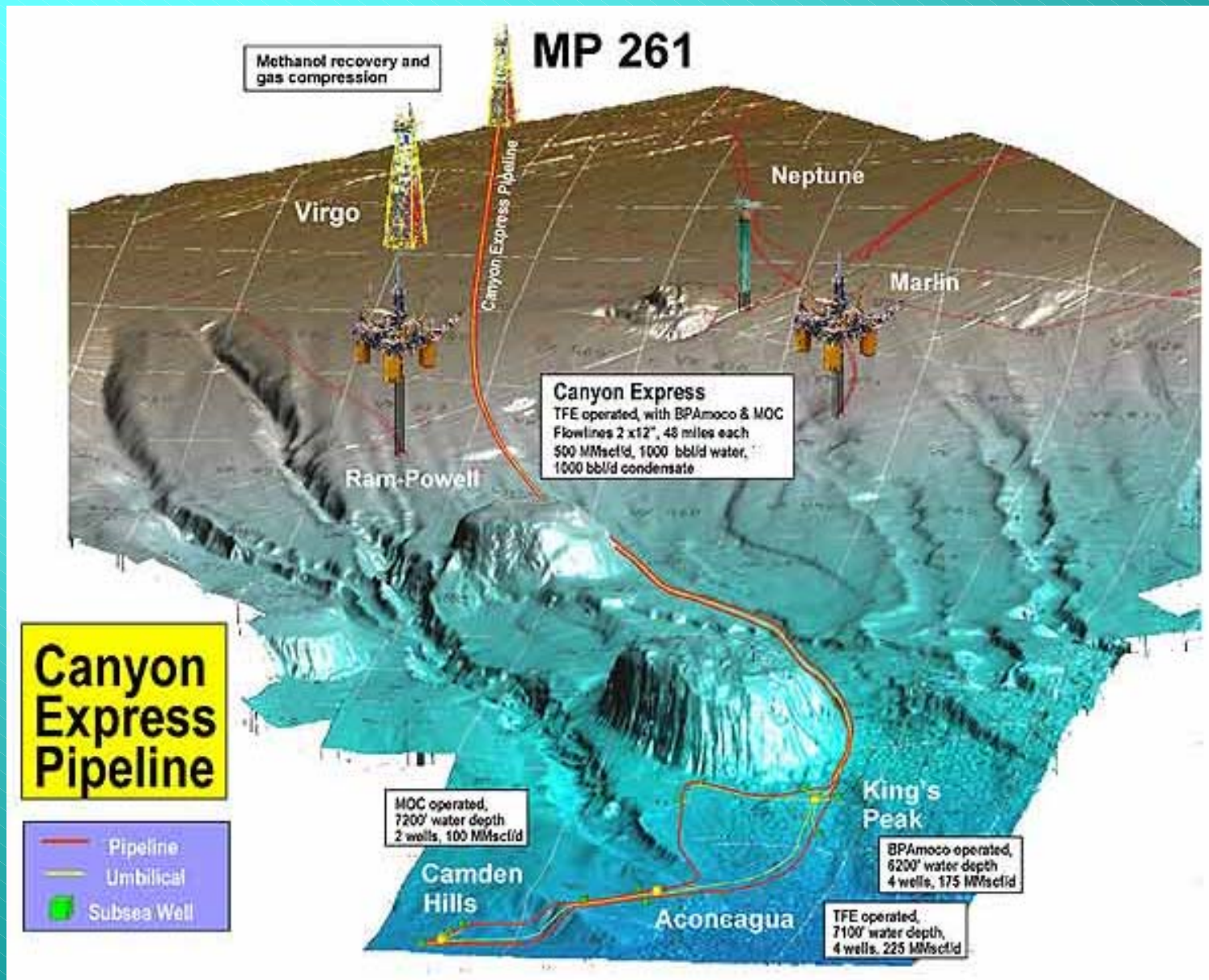




# GEMINI SUBSEA DEVELOPMENT

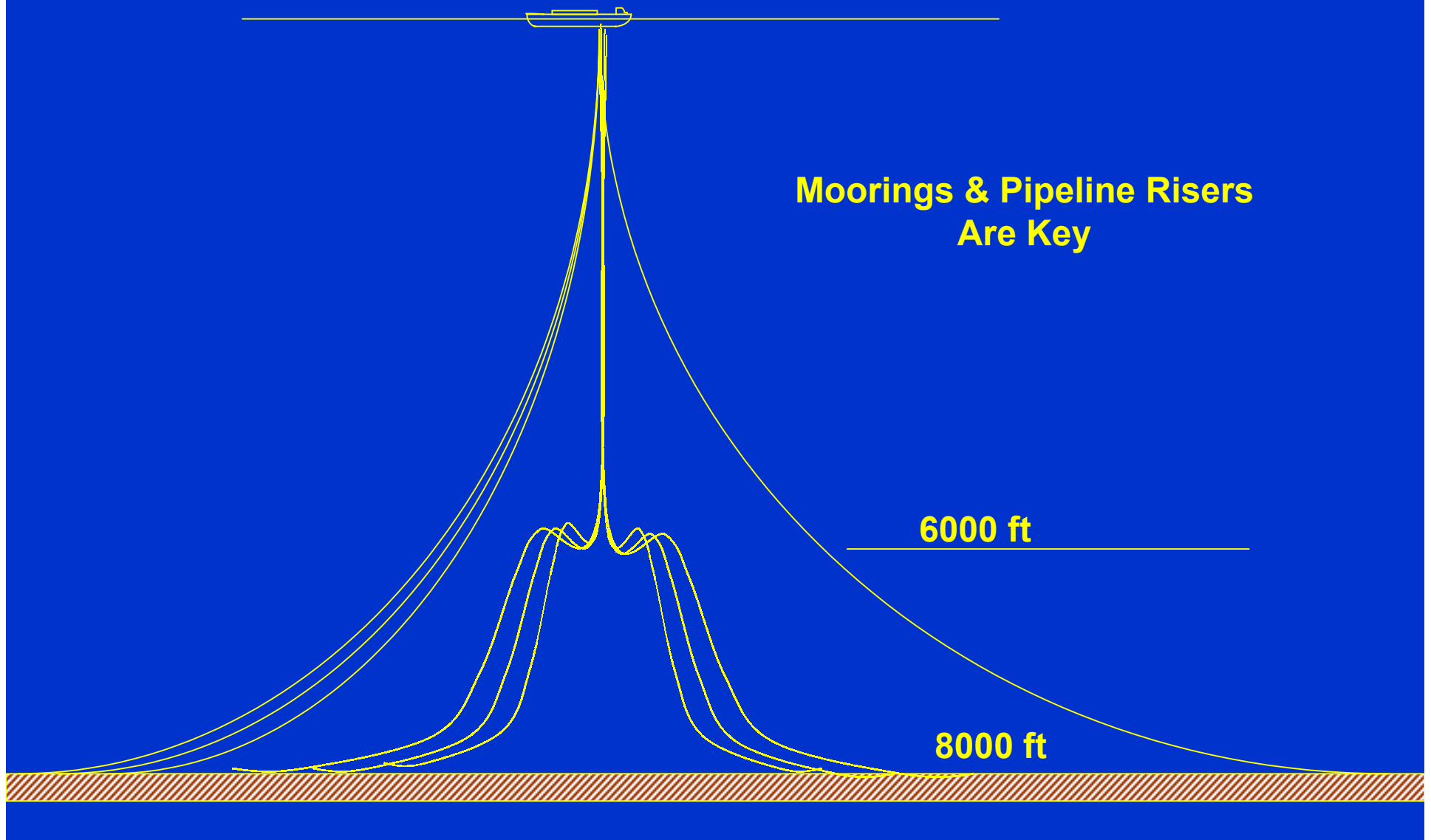


# Subsea Wells – 7,200 Foot Water Depth





## Technology For Ultra-Deep Water





# Technology Advancement Process

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- **Learn From Existing Developments**
- **Study & Simulation Of Next Step**
- **Model & Full Scale Tests**
- **Field Trials**



# Ultra-Deep Water

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Continue to improve understanding of meteorological and oceanographic conditions.

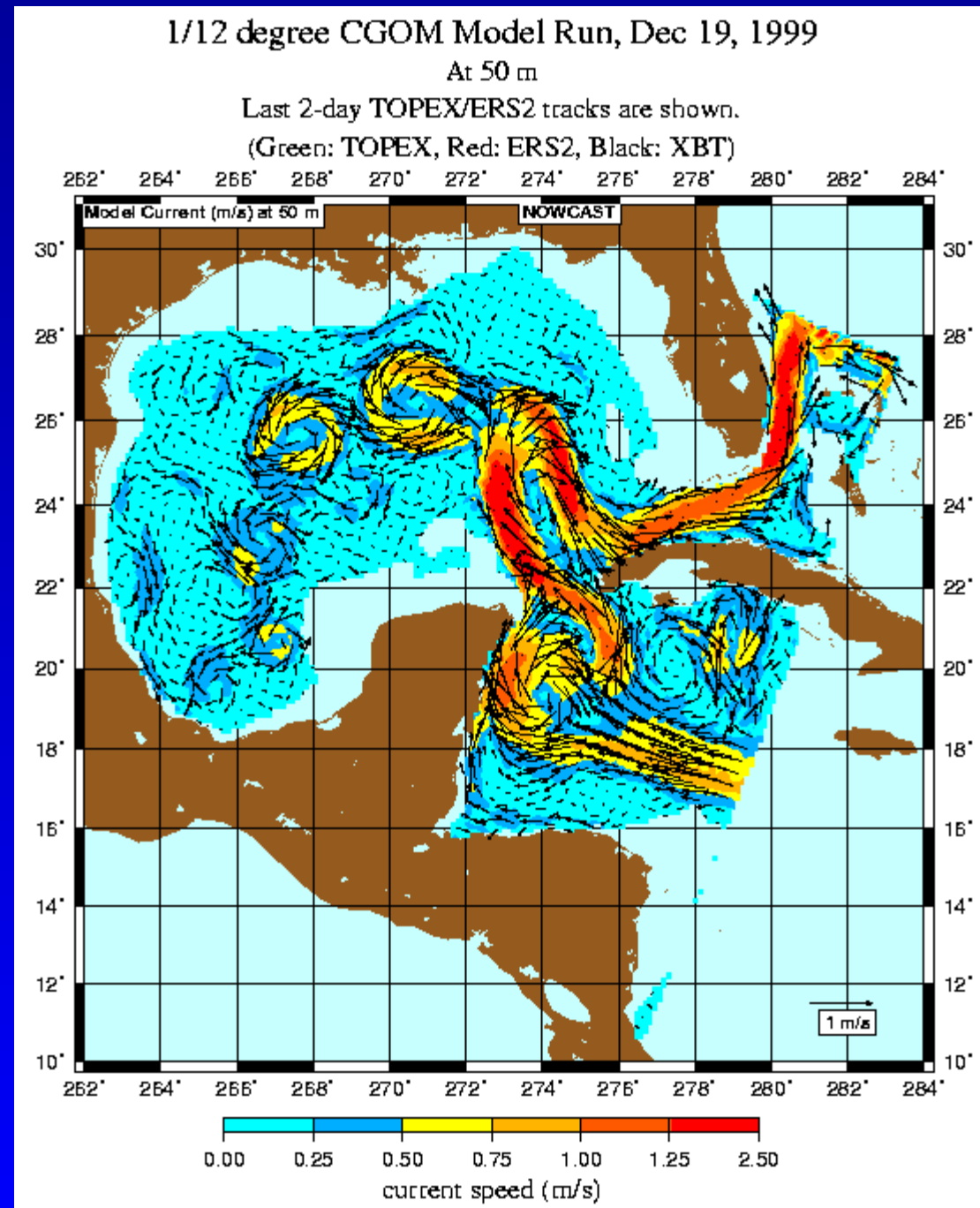
## Gulf Of Mexico Inflow Measurements

## Loop Currents

## Satellite Real Time Monitoring

## Forecasting Models

- University Of Colorado
- MMS



## Model Tests

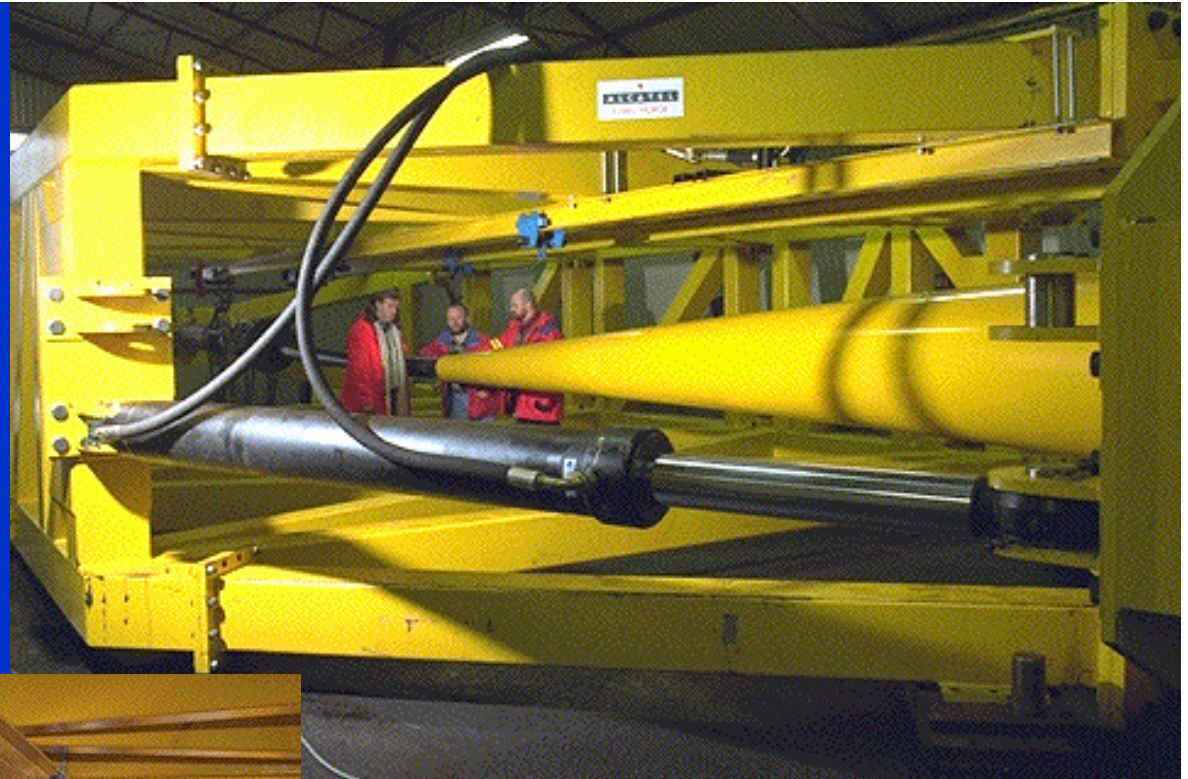


OTRC Test Basin at Texas A&M & Others

# Full Scale Tests

Test Strain relief of  
umbilical at termination.

Work produced a metal  
tube design guideline.



**Dynamic Metal  
Tube Umbilical  
Test - CTR 3304**



# Ultra-Deep Water

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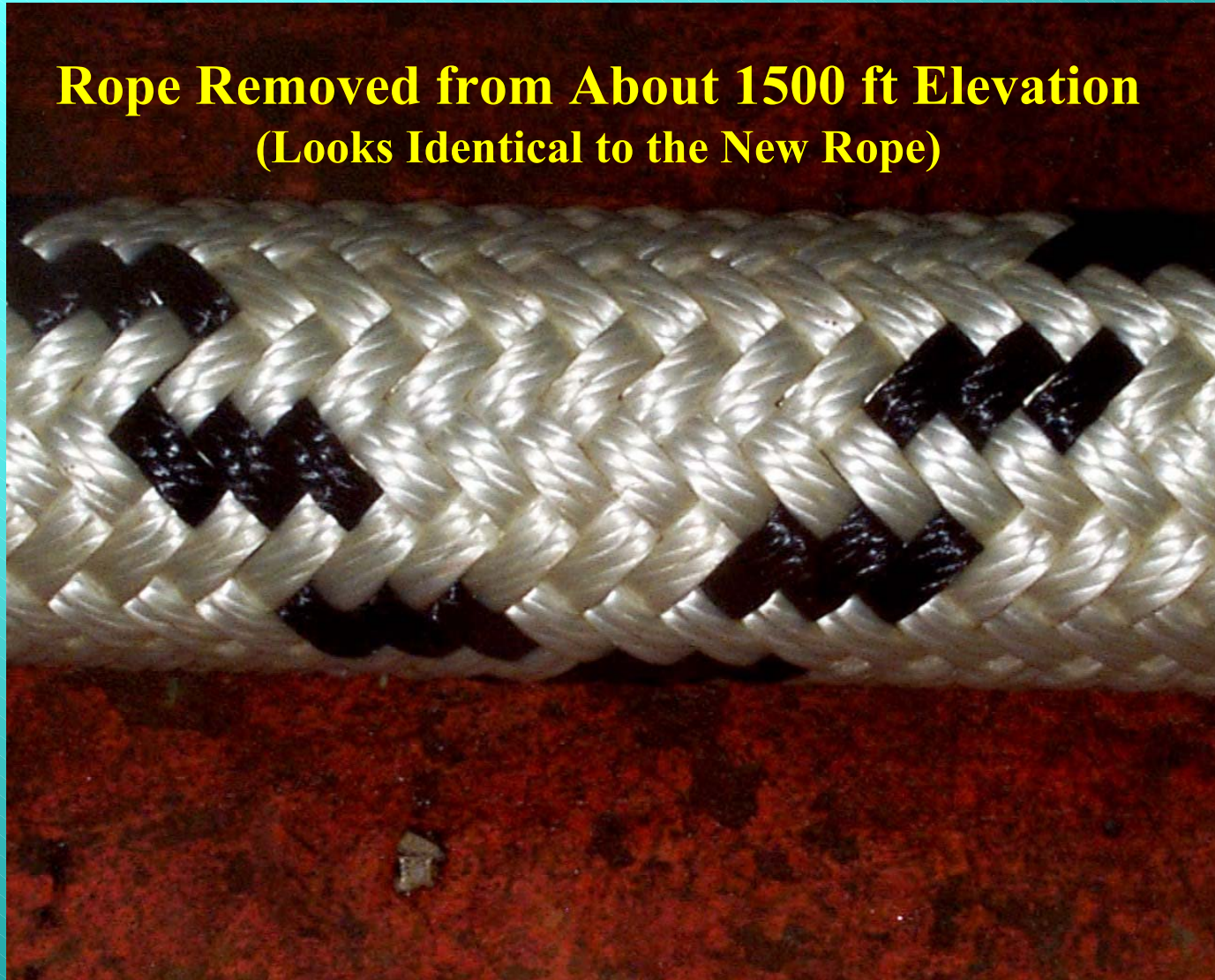
## Technologies For Ultra-Deep Water

- Polyester Moorings
- Composite Risers
- Subsea Processing

Field Trials & Test Deployments Underway

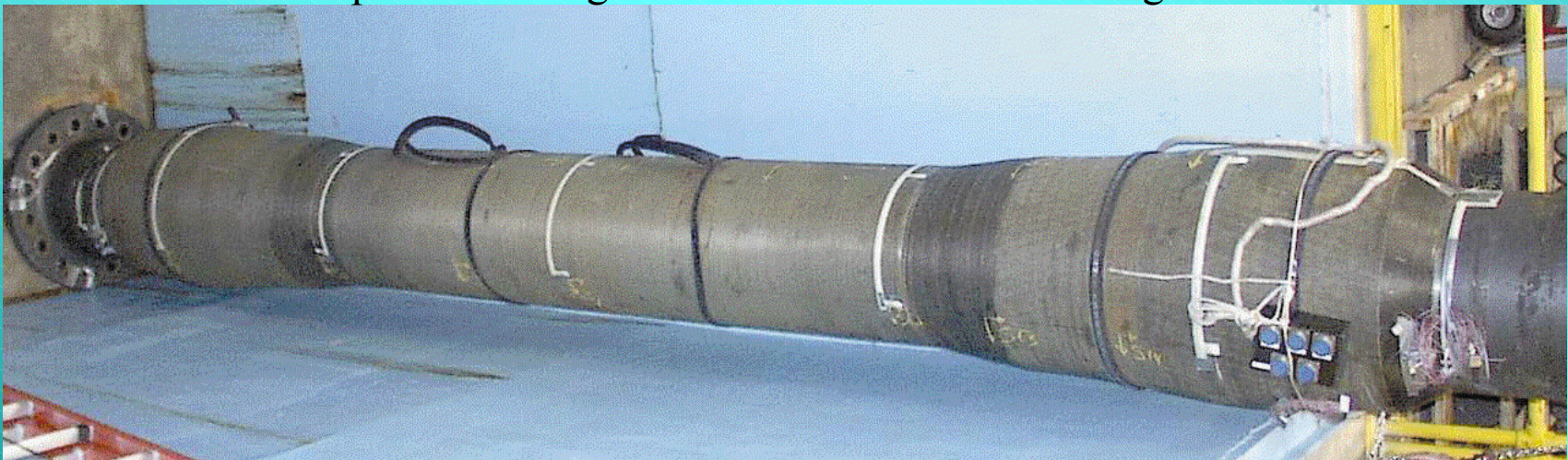
## Polyester Mooring Line Field Trial

**Rope Removed from About 1500 ft Elevation  
(Looks Identical to the New Rope)**

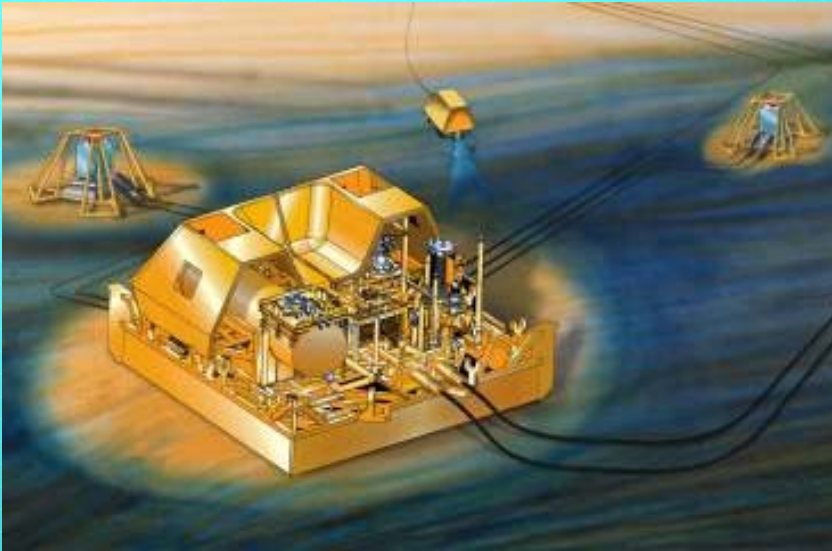


# Composite Riser Section Used As Part Of Deep Water Drilling Riser Short Term Field Trial

Composite Drilling Riser Instrumented for Testing



# Subsea Processing



- Seabed well stream treating
- Prepare for pipeline transport
  - Transport to existing facility for final processing

- Offshore Norway
- Troll Field pilot test
  - Now installed & operating





# Ultra-Deep Water

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- **Successful progression to 7,000 feet**
- **Continue to evolve current proven concepts**
- **Thoughtful managed deployment**